



Ohio State University Bulletin

VOLUME XX

JULY, 1915

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APPLIED OPTICS

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UNIVERSITY CALENDAR

1915

Entrance examinations, Tuesday to Saturday, June 8 to 12, 8 a. m.

Summer Session, June 21 to August 13.

Entrance examinations, Tuesday to Saturday, September 14 to 18, 8 a. m.

Registration Day—First Semester—Tuesday, September 21.

President's Annual Address, Friday, September 24, 11 a. m.

Latest date for registration of candidates for a degree at the Commencement of June 1916, Friday, October 1.

Registration Day, Three-year Courses in Agriculture, First Term, Monday, October 11.

Date for mid-semester reports to the Deans concerning delinquent students, Wednesday, November 17.

Thanksgiving recess begins November 24, 6 p. m., and ends November 30, 8 a. m.

Christmas recess begins Saturday, December 18, 12 m.

1916

Christmas recess ends Tuesday, January 4, 8 a. m.

Registration Day, Three-year Courses in Agriculture, Second Term, Tuesday, January 4.

Final examinations, Thursday, January 27, to Thursday, February 3.

First semester ends Thursday, February 3, 6 p. m.

Registration Day—Second semester—Tuesday, February 8.

Washington's Birthday, Tuesday, February 22.

Close of Second Term, Three-year Courses in Agriculture, Friday, March 17.

Mid-semester reports to the Deans, Saturday, March 18.

Easter recess, Thursday, April 20, 6 p. m., to Tuesday, April 25, 8 a. m.

Memorial Day, Tuesday, May 30.

Competitive Drill—Cadet Regiment—Saturday, June 3.

Commencement, Tuesday, June 6.

Final examinations, Wednesday, June 7, to Wednesday, June 14.

Entrance examinations, Tuesday, June 20, to Saturday, June 24, 8 a. m.

ADMINISTRATIVE OFFICERS

President.....WILLIAM OXLEY THOMPSON

Office: University Hall—99312; N. 476

Residence: University Grounds—2056

Secretary of the Board of Trustees and Business

Manager.....CARL E. STEEB

Office: University Hall (East End)—99332; N. 32

Residence: 1956 Iuka Ave.—5835

Registrar, University Editor and Secretary of

the University Faculty.....EDITH D. COCKINS

Office: 101 University Hall—99314

Residence: 1348 Neil Ave.—16310

Entrance Secretary.....LESTER E. WOLFE

Office: 100 University Hall—99353; N. 939

Residence: 1546 Neil Ave.

APPLIED OPTICS

Professor and Director.....CHARLES SHEARD

Office: 206 Physics Building—99324

Residence: 367 West Tenth Ave.—16109

FOREWORD

The primary purpose of this curriculum is to properly and adequately prepare its students to enter the field of optics as applied to the detection and correction of the errors of refraction, accommodation and associated functions of the eye. To this end the curriculum embodies the following essential and allied branches of instruction: (1) general science and mathematics, (2) the fundamentals of anatomy, histology, physiology and pathology of the human body, (3) special courses on the anatomy and the physiology of the eye, (4) instruction in the detection of pathological and diseased conditions of the eye, and (5) a thorough training in theoretical and practical optics and the applications of optical principles to the correction of visual errors, with an adequate provision for clinical practice in both the refractive and pathological fields. Provision is also made for some elective courses, in order that the student may continue any line of instruction previously pursued or select courses which are germane to his work.

ADMISSION

THE ENTRANCE BOARD

The admission of students is in charge of the University Entrance Board, which determines the credits that shall be issued on all entrance examinations and certificates. Correspondence relative to admission should be addressed to Mr. L. E. Wolfe, Secretary of the Entrance Board, Ohio State University, Columbus, Ohio.

ENTRANCE BY DIPLOMA OR EQUIVALENTS

The following persons are eligible to admission without examinations or conditions:

(1) The holder of a diploma from a first-grade high school in the State of Ohio.

(2) The holder of a properly endorsed certificate from such secondary schools as have been accredited or recognized by the University.

(3) The holder of a 60 count Regents' Certificate of the State of New York.

(4) The holder of 15 credit units as determined by the Entrance Board.

ENTRANCE BY EXAMINATION

Deficiencies in requirements for entrance may be removed by examinations given by the University during the months of September and June.

No student under twenty-one years of age will be admitted if he is conditioned in more than two of the fifteen units. All entrance conditions must be removed within two years after admission.

Students over twenty-one years of age may be admitted upon satisfactory evidence that they can successfully pursue the work

elected. No degree will be granted unless the full entrance requirements have been fulfilled.

For further information, see the *Bulletin of General Information*.

It is urged that students who desire to enter the University put themselves in communication with the Secretary of the Entrance Board at as early a date as possible.

REGISTRATION

Admission to the University must be secured before registration can be accomplished. Registration consists of the following steps in the order indicated: (1) the securing of a class-card from the Director of the Courses in Applied Optics (office, Physics Building, room 206), (2) the securing of a fee-card from the office of the Registrar, and (3) the payment of the fees at the office of the Bursar.

DEGREE

Upon the satisfactory completion of the four-year curriculum, or what is deemed to be its equivalent, a student will receive a Bachelor's Degree.

FEEES AND EXPENSES

All University dues must be paid at the opening of each semester as a condition of admission to classes. Registration is not complete until tuition and certain laboratory fees are paid.

TUITION

First and Second Years. The tuition fee is \$15.00 per semester.

Third and Fourth Years. The tuition fee is \$50.00 per semester. The total tuition fees for the four years aggregate \$260.00.

Special Students or others who take the courses of the third and fourth years, or any portion thereof, shall pay a fee of \$50.00 per semester.

Laboratory Deposits. Students are required to pay for all materials consumed in laboratory work during the first and second years. A cash deposit is required in each course requiring such

materials; the unexpended balance is returned at the end of the semester.

OTHER EXPENSES

Ohio Union. A fee of one dollar a semester is paid by all male students at registration.

Rooms and Board. Furnished rooms, accommodating two students, can be rented at one dollar to one dollar and a half per week for each student. Board at the restaurants and clubs near the University costs from three dollars and twenty-five cents to four dollars per week. The Ohio Union offers board at reasonable rates.

Books. This item of expense varies in the different years; it will average about twenty dollars per year.

NOTE: A student should come prepared to expend about seventy-five dollars during the first ten days of the semester.

INFORMATION

For further information as to entrance requirements, etc., address Mr. L. E. Wolfe, Secretary of the Entrance Board. Correspondence is also invited by Charles Sheard, Professor of Physics and Applied Optics. He will be in his office (Physics Building, room 206) from 9 to 11 a. m. September 15-21.

CURRICULUM

LEADING TO A BACHELOR'S DEGREE

FIRST YEAR

FIRST SEMESTER		SECOND SEMESTER	
Chemistry..... (105 or 109)	4	Chemistry..... (106 or 110)	4
Elementary or General		Elementary or General	
English..... (101)	2	English..... (104)	2
Description and Narration		Exposition and Argumentation	
Drawing..... (101)	2	Drawing..... (102)	3
Elementary Mechanical		Mechanical	
Anatomy..... (125)	4	Anatomy..... (126)	4
Anatomy..... (139)	3	Anatomy..... (140)	3
Histology		Histology	

SECOND YEAR

Physics..... (103 or 105)	4	Physics..... (104 or 106)	4
General		General	
Physiology..... (127)	3	Physiology..... (128)	3
Mathematics..... (121)	3	Mathematics..... (122)	3
College Algebra and Trigonometry		Trigonometry and Analytical Geometry	
Pathology..... (129)	3	Pathology..... (126)	3
*Elective.....	3	*Elective.....	3

THIRD YEAR

Anatomy..... (145)	4	Optics..... (112)	4
The Eye		Theoretical Applied Optics	
Psychology..... (103)	2	Psychology..... (104 and 111)	5
Elementary		Elementary and Experimental	
Optics..... (107)	4	Optics..... (108)	5
Theoretical		Theoretical	
Physiology..... (161)	3	Optics..... (110)	1
The Eye		Mechanical	
*Elective.....	3		

FOURTH YEAR

Optics..... (129)	1	Optics..... (134)	6
Mechanical		Theoretical Applied Optics	
Optics..... (133)	6	Pathology..... (142)	3
Theoretical Applied Optics		The Eye	
Pathology..... (141)	3		
The Eye			
Optics..... (147)	3	Optics..... (148)	5
Clinical Practice		Clinical Practice	
*Elective.....	3	*Elective.....	3

*All electives shall be subject to the Professor of Applied Optics.

DEPARTMENTS OF INSTRUCTION

ANATOMY

125. Human Anatomy. Four credit hours. Mr. Buck and assistants.

Osteology, arthrology, syndesmology and myology, exclusive of the lower portions of the body.

126. Human Anatomy. Four credit hours. Mr. Buck and assistants.

Myology, angiology, splanchnology and peripheral nervous system, exclusive of the lower portions of the body.

139-140. Histology and Embryology. Three credit hours. Mr. Warren and assistants.

The histology of the tissues, the histology and embryology of organs, with special emphasis laid upon the head and neck regions.

145. Anatomy of the Eye. Four credit hours. Mr. Landacre.

The comparative anatomy of the vertebrate eye and its associated muscles and nerves, including a dissection of the brain and cerebral nerves of the shark and the skull and gross structure of the mammalian eye; the minute structure and embryology of the mammalian eye, including the study of the human skull and eye.

APPLIED OPTICS

107. Theoretical Optics. Four credit hours. Mr. Sheard.

Recitations, lectures and laboratory work on reflection; refraction and refractive indices; prisms; refraction by curved surfaces; thin lenses and lens calculations; cylinders; transpositions; oblique cylindricals and oblique sphericals. The emphasis is laid on the fundamental principles, with numerous numerical problems.

108. Theoretical Optics. Five credit hours. Mr. Sheard.

Recitations, lectures and laboratory work on ophthalmic prisms; decentration; effectivity and back focal length; equivalence of various forms of ophthalmic lenses; vertex refraction; thick lenses and combinations; chromatic and spherical aberration; interference; diffraction and polarization.

110. Mechanical Optics. One credit hour. Mr. Sheard and assistants.

Practical work in neutralizing; lens centering; use of abrasives; simple surface and edge grinding and drilling. Lectures on history and manufacture of glass and the composition of various kinds of optical glass.

129. Mechanical Optics. One credit hour. Mr. Sheard and assistants.

Practical work in lens mounting, frame and frameless; simple soldering; face measurements; bridge bending; mountings and clips and the adjustment of spectacles and eye-glasses. Practice in grinding prisms, prisms in combination and in grinding and finishing bi-focal lenses.

112. Theoretical Applied Optics. Four credit hours. Mr. Sheard and lecturers.

The principles of refraction in the human eye based on the laws of conjugate foci, dealing in detail with hyperopia, myopia and astigmatism. Skiametry (static method) and technique in shadow measuring. Skiametry and the subjective method in the correction of refractive errors. Practical work with the schematic eye and the refraction of some selected cases.

133-134. Theoretical Applied Optics. Six credit hours. Mr. Sheard and lecturers.

Recitations, lectures and demonstrations on optical constants of the eye; mathematical and physical methods and calculations applied to the correction of anomalies of the eye; entoptic phenomena; monocular and binocular vision; convergence; study of selected reports and cases from clinical practice; the relations between radiant energy and the eye.

During the first semester special lectures and demonstrations will be given, involving dynamic skiametry, ophthalmometry and ophthalmoscopy.

During the second semester these special lectures and demonstrations will deal with the stereoscopic aspects of the various correlated visual functions and the value of lenses as economic agencies in binocular vision.

147. **Clinical Practice.** Three credit hours. Mr. Sheard.

148. **Clinical Practice.** Five credit hours. Mr. Sheard.

CHEMISTRY

105. **Elementary Chemistry.** Four credit hours. Mr. Evans and assistants.

A general course on the chemistry of non-metals arranged for students who have not presented chemistry as an entrance requirement.

106. **Elementary Chemistry and Qualitative Analysis.** Mr. Evans and assistants.

A general course on the chemistry of metals. The laboratory work accompanying is a general introductory course in qualitative analysis.

109. **General Chemistry.** Four credit hours. Mr. Evans and assistants.

A general course on the chemistry of non-metals. It is more advanced than Course 105 and is arranged for students who have an acceptable course in elementary chemistry in a secondary school.

110. **General Chemistry and Qualitative Analysis.** Mr. Evans and assistants.

A general course on the chemistry of the metals. Laboratory work is a general course in qualitative analysis.

DRAWING

101. **Elementary Mechanical Drawing.** Two credit hours. Mr. French and department instructors.

Practice in the use of drawing instruments, elementary projections.

102. Mechanical Drawing. Three credit hours. Mr. French and department instructors.

Lettering, orthographic, isometric and oblique projections.

ENGLISH

101. Paragraph Writing: Description and Narration. Two credit hours. Texts: Scott and Denney's Paragraph Writing and Duncan, Beck and Graves' Specimens of Prose Composition. All instructors.

104. Paragraph Writing: Exposition and Argumentation. Two credit hours. All instructors.

MATHEMATICS

121. College Algebra and Trigonometry. Three credit hours. Mr. Swartzel, Mr. Rasor, Mr. Arnold, Mr. West.

122. Plane Trigonometry and Analytical Geometry. Three credit hours. Mr. Swartzel, Mr. Rasor, Mr. Arnold, Mr. West.

PATHOLOGY

126. Bacteriology. Three credit hours. Mr. Spohr, Mr. Tressel. Disinfection and sterilization; the preparation of culture media.

129. Pathology. Three credit hours. Mr. Wright, Mr. Tressel. General pathology, including the etiology of diseases, distribution of nutrition, inflammation and tumors.

141-142. Pathology of the Eye. Three credit hours. The year. A laboratory course covering the gross and histological lesions involving the eye.

PHYSICS

103-104. General Physics. Four credit hours. Mr. Earhart. A non-mathematical course for students who have no entrance credit in physics.

105-106. General Physics. Four credit hours. Mr. Blake.

PHYSIOLOGY

127. Physiology. Three credit hours. Mr. McPeck and assistants.

The physiology of unicellular structures, muscle and nerve, central nervous system, autonomic system, external and internal senses, blood and heart. Reports of papers by students.

128. Physiology. Three credit hours. Mr. McPeck and assistants.

The physiology of the circulatory and respiratory mechanisms, digestion, excretion, metabolism, etc.

161. Physiology of the Eye. Three credit hours.

PSYCHOLOGY

103-104. Elementary Psychology. Two credit hours. Mr. Arps.

111. Experimental Psychology. Three credit hours. Mr. Arps.

Topics: The sense fields, geometrical optical illusions, stereoscopic and pseudoscopic illusions, tactual space perception, auditory localization, attention, reaction-time, memory types, tonal fusion, association and analysis of judgment.



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